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FITZPATRICK CELLA HARPER & SCINTO			YE, LIN	
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			2615	

DATE MAILED: 02/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/422,792	MOCHIZUKI, CHIORI	
	<b>Examiner</b>	<b>Art Unit</b>	
	Lin Ye	2615	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 28 December 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-8,11-18,21,23-30,52 and 53 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8,11-18,21,23-30,52 and 53 is/are rejected.
- 7) ☒ Claim(s) 14 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 October 1999 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Response to Amendment*

1. Applicant's amendments with respect to claims 1-8, 11-18, 21, 23-30, 52 and 53 filed on 07/14/05 have been considered but are moot in view of the new ground(s) of rejection.

For claims 1, 15, 23, 27 and 52, a response is considered necessary for the applicant's arguments, because the applicant believes that **non** of the cited references discloses or suggest the claimed requirement wherein a material of the additional layer is different from that of said protective layer, wherein a surface of the additional layer is flatter than the surface of said protective layer, and wherein said wavelength converter comprises a columnar crystal scintillator arranged by being deposited on a flat surface of the additional layer.

The examiner disagrees. The cited reference, Shigeta et al. Patent 5,739, 548 (this reference cited for claims 3 and 17 in last Office Action mailed on 9/28/05) clearly discloses in Figure 5, an image pick-up apparatus comprising protective layer (interlayer insulating film 16, see Col. 6, lines 50-60) arranged on the substrate (11) so as to cover said photoelectric conversion elements (12); and an additional layer (flattening layer 30), arranged on a surface of the protective layer (16); wherein a material of said additional layer is different from that of said protection layer (e.g., the additional layer 30 is any combination of the following materials, such as a silicon oxide film and a phenol resin film; a fluorine resin film and a silicon oxide film; a fluorine resin film and an acrylic resin film; a fluorine resin film and a phenol resin film; a fluorine resin film and a polyimide resin film; a silicon oxide

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film and an acrylic resin film; a silicon oxide film and a polyimide resin film; and an acrylic resin film and a phenol resin film. The material of additional layer 30 is semiconductor material and clearly different with material of the insulating film 16, see Col. 6, lines 63-67 and Col. 7, lines 1-6); wherein a surface of the additional layer (30) is flatter than the surface of the protection layer (16) as shown in Figure 5. The cited reference, Possin et al. U.S. Patent 5,430,298, discloses the wavelength converter (scintillator 110) deposited on a flat surface of said additional layer (170) as shown in Figure 1. The cited reference Lubowski et al. U.S. Patent 4,011,454, discloses the wavelength converter comprises a columnar crystal scintillator (See Lubowski's Abstract section).

### ***Claim Objections***

2. Claim 14 is objected to because of the following informalities:

The **original** claim 14 only discloses “**sensor** substrates”. It does not disclose “**insulating** substrates”.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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4. Claims 1-3 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Possin et al. U.S. Patent 5,430,298 in view of Shigeta et al. Patent 5,739, 548 and Lubowski et al. U.S. Patent 4,011,454.

Referring to claim 1, the Possin reference discloses in Figures 1-2, an image pick-up apparatus (computed topography imager apparatus 100 for detection of x-ray, see Col. 3, lines 44-46) comprising: a plurality of photoelectric conversion elements (e.g., a plurality of photosensor devices 124) and a switching element (140), arranged on an substrate (e.g., photo sensor array block 130 includes a substrate 138, see Col. 3, lines 61-63 and Col. 4, lines 24-25); a wavelength converter (scintillator 110, see Col. 3, lines 42-44) positioned and configured to convert incident radiation to light having light having a wavelength detectable by said photoelectric conversion elements; a protective layer (a pixel boundary light barrier 180, see Col. 3, lines 39-40) arranged on the substrate (138) so as to cover said photoelectric conversion elements and said switching elements (see Col. 6, lines 42-46); and a flattening layer (optical coupling layer 170, see Col. 3, lines 65-67) arranged on a surface of the protective layer (180); wherein the wavelength converter deposited on the flattening layer (optical coupling layer 170) and comprises a scintillator (110). However, the Possin reference does not explicitly shows wherein a material of the additional layer is different from that of said protective layer, wherein a surface of the additional layer is flatter than the surface of said protective layer.

The Shigeta reference teaches in Figure 5, an image pick-up apparatus comprising protective layer (interlayer insulating film 16, see Col. 6, lines 50-60) arranged on the substrate (11) so as to cover said photoelectric conversion elements (12); and an additional

layer (flattening layer 30), arranged on a surface of the protective layer (16); wherein a material of said additional layer is different from that of said protection layer (e.g., the additional layer 30 is any combination of the following materials, such as a silicon oxide film and a phenol resin film; a fluorine resin film and a silicon oxide film; a fluorine resin film and an acrylic resin film; a fluorine resin film and a phenol resin film; a fluorine resin film and a polyimide resin film; a silicon oxide film and an acrylic resin film; a silicon oxide film and a polyimide resin film; and an acrylic resin film and a phenol resin film. The material of additional layer 30 is semiconductor material and clearly different with material of the insulating film 16, see Col. 6, lines 63-67 and Col. 7, lines 1-6); wherein a surface of the additional layer (30) is flatter than the surface of the protection layer (16) as shown in Figure 5. The Shigeta reference is evidence that one of ordinary skill in the art at the time to see more advantages for the system has two different material for additional layer and protective layer and also the surface of the additional layer is flatter than the surface of the protection layer so that the additional layer can be formed in a very small thickness and the distance between the micro lens and the light receiving portion can be made small (See Col. 3, lines 30-40). For that reason, it would have been obvious one of ordinary skill in the art at the time to modify the image pick-up apparatus of Possin ('298) for providing the material of the additional layer is different from that of said protective layer, wherein a surface of the additional layer is flatter than the surface of said protective layer as taught by Shigeta ('548).

The Possin reference does not explicitly shows a detail about the scintillator (110) comprises a columnar crystal scintillator.

The Lubowski reference discloses in Figures 1-3, an x-ray image intensifier comprising a structured scintillator screen produced by a vacuum evaporation process in which Cesium iodide (CsI) is evaporated from a source boat and deposited on a topographically structured surface to produce columnar scintillator elements (See Abstract section). The Lubowski reference is evidence that one of ordinary skill in the art at the time to see more advantages for the scintillator has a CsI columnar crystal so that to increase the proportion of light photons generated which leaves the upper surface when the column is thought of as extending up from the substrate (See Col. 2, lines 5-20). For that reason, it would have been obvious one of ordinary skill in the art at the time to see the scintillator (110) comprises a columnar CsI columnar crystal disclosed by Possin ('298).

Referring to claim 2, the Possin, Shigeta and Lubowski references disclose all subject matter as discussed in respected claim 1, and the Shigeta reference discloses wherein the additional layer (30) is obtained by flattening a protective layer (16) provided on the substrate (11) as shown in Figure 5.

Referring to claim 3, the Possin reference does not explicitly states the flattening layer comprises a polyimide resin.

The Shigeta reference teaches in Figure 5, a solid state imaging device comprising additional layer (30) are formed out of any of the following combinations: a silicon oxide film and a phenol resin film; a fluorine resin film and a silicon oxide film; a fluorine resin film and an acrylic resin film; a fluorine resin film and a phenol resin film; a fluorine resin film and a polyimide resin film; a silicon oxide film and an acrylic resin film; a silicon oxide film and a polyimide resin film; and an acrylic resin film and a phenol resin film (See Col. 6,

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lines 63-67 and Col. 7, lines 1-6). The Shigeta reference is evidence that one of ordinary skill in the art at the time to see more advantages for flattening layer comprising a polyimide resin so that such the material can be melted into a liquid stat through a heat treatment for the flattening layer and the flattening layer can be formed in a very small thickness (See Col. 3, lines 33-40). For that reason, it would have been obvious one of ordinary skill in the art at the time to see the flattening layer comprises a polyimide resin disclosed by Possin ('298).

Referring to claim 11, the Possin, Shigeta and Lubowski references disclose all subject matter as discussed in respected claim 1, and the Lubowski reference discloses the scintillator comprises a CsI crystal (See Abstract section).

5. Claims 15-18 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Possin et al. U.S. Patent 5,430,298 in view of Shigeta et al. Patent 5,739,548, Lubowski et al. U.S. Patent 4,011,454 and Kobayashi et al. U.S. Patent 5,793,047.

Referring to claim 15, the Possin, Shigeta and Lubowski references disclose all subject matter as discussed with respected to with claim 1. However, the Possin reference does not explicitly show the sensor substrate (138) can be added an additional insulating substrate layer instead of only electrically conductive substrate layer.

The Kobayashi reference teaches in Figures 5A-5C, the image pick-up apparatus comprising a substrate which includes an insulating substrate layer 21 and a lower electrode 22; a plurality of pixels (p-layer 23, i-layer 24 and n-later 25) arranged on the substrate (21 and 22); in Figure 15A, photoelectric conversion elements 4 are mounted on an insulating substrate (glass substrates 1) are to be bonded in the base 2 (See Col. 14, lines 34-37); and in



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Figure 26, all substrates are bonded to on large substrate (80) which either is an insulating substrate (glass substrate) or electrically conductive substrate (copper plate) (See Col. 20, lines 4-8). The Kobayashi reference is evidence that one of ordinary skill in the art at the time to see more advantages for the system has more flexible option to add additional insulating material under electrically conductive material layer for a base substrate of image sensor so that all pixel elements in the image sensor can be completely protected and separated from each other. For that reason, it would have been obvious one of ordinary skill in the art at the time to modify the image pick-up apparatus of Possin ('298) for providing an additional insulating substrate layer under the layer 138 (e.g. the layer 138 is still be able to apply a bias voltage to photodiodes 124) for the sensor substrate as taught by Kobayashi ('047).

Referring to claim 16, the Possin, Shigeta, Lubowski and Kobayashi references disclose all subject matter as discussed in respected to same comment as with claims 2 and 15.

Referring to claim 17, the Possin, Shigeta, Lubowski and Kobayashi references disclose all subject matter as discussed in respected to same comment as with claims 3 and 15.

Referring to claim 18, the Possin, Shigeta, Lubowski and Kobayashi references disclose all subject matter as discussed in respected to claim 16, and the additional layer is arranged on the plurality of insulating substrates (e.g., the Kobayashi discloses the plurality of insulating substrates such as insulating substrate layer 21 and large substrate 80).

Referring to claim 21, the Possin, Shigeta, Lubowski and Kobayashi references disclose all subject matter as discussed in respected to same comment as with claims 11 and 15.

6. Claims 4-8, 12-13 and 23-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Possin et al. U.S. Patent 5,430,298 in view of Shigeta et al. Patent 5,739,548, Lubowski et al. U.S. Patent 4,011,454 and Majewski et al. U.S. Patent 6,271,525.

Referring to claims **4 and 6**, the Possin, Shigeta and Lubowski references disclose all subject matter as discussed in respected claim 1, except the references do not explicitly show a second additional layer is provided on the wavelength converter so that the wavelength converter is flattened.

The Majewski reference discloses in Figures 1-4, an image pick-up apparatus comprising a wavelength converter (scintillator layer 12) for converting an incident radiation (gamma radiation); a flattening layer (bonding/protective layer 40, see Col. 3, lines 46-55) is provided on the wavelength converter (12). The Majewski reference is evidence that one of ordinary skill in the art at the time to see more advantages for an image pick-up apparatus comprising a flattening layer that is provided on the wavelength converter so that serving to cushion or protect the friable wavelength converter layer (12) from physical damage through shock (See Col. 3, lines 38-41). For that reason, it would have been obvious one of ordinary skill in the art at the time to modify the image pickup apparatus of Possin ('298) for providing the second flattening layer on the wavelength converter so the wavelength converter is flattened as taught by Majewski ('525).

Referring to claim 5, the Possin, Shigeta, Lubowski and Majewski references disclose all subject matter as discussed in respected claim 4, and the Majewski reference discloses wherein the second flattening layer (40) covers the end face of the wavelength converter as shown in Figure 1.

Referring to claim 7, the Possin, Shigeta, Lubowski and Majewski references disclose all subject matter as discussed in respected claims 4 and 6, and the Majewski reference discloses wherein a light reflection film (a thin foil of aluminum layer 36) is provided on the second flattening layer (See Col. 3, lines 23-25).

Referring to claim 8, the Possin, Shigeta, Lubowski and Majewski references disclose all subject matter as discussed in respected claim 4 and 6, and he Majewski reference discloses wherein a light reflection film (36) is provided on the flattened wavelength converter (12) as shown in Figure 1.

Referring to claim 12, the Possin, Shigeta, Lubowski and Majewski references disclose all subject matter as discussed in respected claim 7, and the Majewski reference discloses wherein the light reflection film (a thin foil of aluminum layer 36) is made of an aluminum film.

Referring to claim 13, the Possin, Shigeta, Lubowski and Majewski references disclose all subject matter as discussed in respected to same comment as with claims 8 and 12.

Referring to claim 23, the Possin, Shigeta and Lubowski references disclose all subject matter as discussed in respected to same comment as with claim 1, except the Possin reference does not explicitly show a signal processing means for processing the signal from the image pick-up apparatus, and display means for displaying the signal from the signal processing means.

The Majewski reference discloses a signal processor for processing the signal (digitizer 18 digitizes the output of array 16) from the image pick-up apparatus; and a display configured to for display the processed signal from the signal processor as shown in Figure 4

(See Col. 2., lines 55-65). The Majewski reference is evidence that one of ordinary skill in the art at the time to see more advantages for the image pick-up system including a signal processor for processing the signal from the image pick-up apparatus and a display means for displaying the signal from the signal processing so that user can review captured image from the display immediately. For that reason, it would have been obvious one of ordinary skill in the art at the time to modify the image pickup apparatus of Possin ('298) for providing the signal processing means for processing the signal from the image pick-up apparatus and display means for displaying the signal from the signal processing means as taught by Majewski ('525).

Referring to claim 24, the Possin, Shigeta, Lubowski and Majewski references disclose all subject matter as discussed in respected to claim 23, and the Majewski reference discloses a telecommunication device configured to transfer the signal from the signal processor (See Col. 2, lines 64-65).

Referring to claim 25, the Possin, Shigeta, Lubowski and Majewski references disclose all subject matter as discussed in respected to claim 23, and the Majewski reference discloses a recorder configured to record the signal from the signal processor (computer 20 is for recoding the signal output from digitizer 18).

Referring to claim 26, the Possin, Shigeta, Lubowski and Majewski references disclose all subject matter as discussed in respected to claim 23, and the Majewski reference discloses a storage device configured to store the signal from the signal processor (computer 20 inherently has a storage means that recoding the signal output from digitizer 18 and transfer data to remote location).

7. Claim 14 and 27-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Possin et al. U.S. Patent 5,430,298 in view of Shigeta et al. Patent 5,739,548, Lubowski et al. U.S. Patent 4,011,454, Kobayashi et al. U.S. Patent 5,793,047 and Majewski et al. U.S. Patent 6,271,525.

Referring to claim 14, the Possin, Shigeta, Lubowski, Kobayashi and Majewski references disclose all subject matter as discussed in respected to claims 8 and 15, and the additional layer is arranged on the plurality of insulating substrates (e.g., the Kobayashi discloses the plurality of insulating substrates such as insulating substrate layer 21 and large substrate 80).

Referring to claim 27, the Possin, Shigeta, Kobayashi, Lubowski and Majewski references disclose all subject matter as discussed with respected to same comment as with claims 15 and 23.

Referring to claim 28, the Possin, Shigeta, Kobayashi, Lubowski and Majewski references disclose all subject matter as discussed with respected to same comment as with claims 15 and 25.

Referring to claim 29, the Possin, Shigeta, Kobayashi, Lubowski and Majewski references disclose all subject matter as discussed with respected to same comment as with claims 15 and 24.

Referring to claim 30, the Possin, Shigeta, Kobayashi, Lubowski and Majewski references disclose all subject matter as discussed with respected to same comment as with claims 15 and 26.

8. Claims 52-53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Possin et al. U.S. Patent 5,430,298 in view of Shigeta et al. Patent 5,739,548, Lubowski et al. U.S. Patent 4,011,454 and Yamazaki et al. U.S. Patent 5,700,333.

Referring to claims 52-53, the Possin, Shigeta and Lubowski references disclose all subject matter as discussed in respected to claim 1, except the Possin reference does not explicitly state the photoelectric conversion elements comprise non-crystalline semiconductor material, such as amorphous silicon film, etc.

The Yamazaki reference discloses in Figure 1A, a thin-film photoelectric conversion device comprise non-crystalline semiconductor material (see Col. 3, lines 30-35), such as a amorphous silicon film (103), a silicon oxide film (102) and glass substrate (101) as an underlying layer (See col. 4, lines 26-42). The Yamazaki reference is evidence that one of ordinary skill in the art at the time to see more advantages photoelectric conversion elements comprise non-single crystalline semiconductor so as forming an excellent photoelectric conversion characteristic. For that reason, it would have been obvious one of ordinary skill in the art at the time to see the photoelectric conversion elements comprise non-crystalline semiconductor material, such as amorphous silicon film, etc., disclosed by Possin ('298).

### ***Conclusion***

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9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lin Ye whose telephone number is (571) 272-7372. The examiner can normally be reached on Mon-Fri 8:00AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Ometz can be reached on (571) 272-7593. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Lin Ye', with a stylized, flowing script.

Lin Ye  
Examiner  
Technology Division 2622

February 16, 2006